

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

Claims 1-6. Canceled.

7. (Currently Amended) A receiver apparatus (~~52~~; ~~62~~) for receiving, by a plurality of receiver antennas (~~105-1 to 105-2; 105-2 to 105-4~~), transmission signals ( $s_1, s_2$ ) transmitted from a transmitter apparatus (~~51~~; ~~61~~) by a plurality of transmitter antennas (~~104-1, 104-2~~) in a parallel manner and for estimating a channel matrix ( $H$ ) for causing the transmission signals ( $s_1, s_2$ ) to be related to received signals ( $r_1, r_2; r_1 \rightarrow r_4$ ) to demodulate the received signals based upon said channel matrix; the receiver apparatus comprises:

calculation means (~~501~~; ~~601~~) for calculating a physical amount so as to estimate a radio line quality with respect to each of signal series based upon only said channel matrix ( $H$ );

determination means (~~111~~) for evaluating the radio line quality based upon the physical amount calculated by said calculation means so as to determine a transmission parameter ( $X_{next}$ ) in a next transmission operation by said transmitter apparatus with respect to each of the signal series;

transmission means (~~71~~) for transmitting the transmission parameter determined by said determination means to said transmitter apparatus; and

detection means (~~107~~) for detecting a change in the transmission parameter from the received signals with respect to each of the signal series.

8. (Original) A receiver apparatus as claimed in claim 7 wherein, said physical amount is an SNR of said demodulated signals.

9. (Original) A receiver apparatus as claimed in claim 7 wherein, said physical amount corresponds to a sum of SNRs of signals which are detected by said plurality of receiver antennas when it is assumed that said plurality of transmitter antennas separately transmit signals.

10. (Original) A receiver apparatus as claimed in claim 9 wherein,

said physical amount corresponds to a sum of one, or a plurality of said SNRs having larger values.

11. (Original) A receiver apparatus as claimed in any one of claim 7 to claim 10 wherein

said transfer parameter is a modulation level in mapping.

12. (Currently Amended) A radio communication system comprising a transmitter apparatus (~~51; 61~~) for transmitting transmission signals (~~s<sub>1</sub>, s<sub>2</sub>~~) by a plurality of transmitter antennas (~~104-1, 104-2~~) in a parallel manner; and a receiver apparatus (~~52; 62~~) for receiving said transmission signals ( $s_1, s_2$ ) by a plurality of receiver antennas (~~105-1 to 105-2; 105-1 to 105-4~~), a for estimating a channel matrix ( $H$ ) for causing the transmission signals (~~s<sub>1</sub>, s<sub>2</sub>~~) to be related to received signals (~~r<sub>1</sub>, r<sub>2</sub>; r<sub>4</sub> to r<sub>4</sub>~~) to demodulate the received signals based upon said channel matrix; wherein

said receiver apparatus comprises:

calculation means (~~501; 601~~) for calculating a physical amount so as to estimate a radio line quality with respect to each of signal series based upon only said channel matrix ( $H$ );

determination means (~~411~~) for evaluating the radio line quality based upon the physical amount calculated by said calculation means so as to determine a transmission parameter ( $X_{next}$ ) in a next transmission operation by said transmitter apparatus with respect to each of the signal series;

transmission means (~~71~~) for transmitting the transmission parameter determined by said determination means to said transmitter apparatus; and

detection means (~~107~~) for detecting a change in the transmission parameter from the received signals with respect to each of the signal series; and wherein,

said transmitter apparatus comprises:

reception means (~~72~~) for receiving said transmission parameter transmitted by said determining means; and

means (~~201-1, 201-2~~) for controlling the transmission operation with respect to each of the signal series based upon said transmission parameter received by said reception means.

13. (Original) A radio communication system as claimed in claim 12 wherein, said physical amount is an SNR of said demodulated signals.
14. (Original) A radio communication system as claimed in claim 12 wherein, said physical amount corresponds to a sum of SNRs of signals which are detected by said plurality of receiver antennas when it is assumed that said plurality of transmitter antennas separately transmit signals.
15. (Original) A radio communication system as claimed in claim 14 wherein, said physical amount corresponds to a sum of one, or a plurality of said SNRs having larger values.
16. (Original) A radio communication system as claimed in any one of claim 12 to claim 15 wherein:  
said transfer parameter is a modulation level in mapping.
17. Cancel.
18. (Currently Amended) A transmitter apparatus (51A; 61A) for transmitting data by a plurality of transmitter antennas (104-1, 104-2) in a parallel manner to a receiver apparatus (52A, 62A) for receiving by a plurality of receiver antennas (105-1, 105-2; 105-1 to 105-4), said transmitter apparatus being used in a radio communication system in which a channel matrix for causing the signal transmitted by said transmitter apparatus to be related to said signal detected by said receiver apparatus becomes identical to a channel matrix for causing the signal transmitted by said receiver apparatus to be related to said signal detected by said transmitter apparatus; wherein,  
said transmitter apparatus comprises:  
estimation means (16) for estimating said channel matrix;  
calculation means (501; 601) for calculating a physical amount so as to estimate a radio line quality with respect to each of signal series based upon only said channel matrix;  
determination means (111) for evaluating the radio line quality based upon the physical amount calculated by said calculation means so as to determine a transmission

parameter in a next transmission operation with respect to each of the signal series based upon the transmission parameter determined by said determination means.

19. (Original) A transmitter apparatus as claimed in claim 18 wherein, said physical amount corresponds to an SNR of demodulated signals of said receiver apparatus.

20. (Original) A transmitter apparatus as claimed in claim 18 wherein, said physical amount corresponds to a sum of SNRs of signals which are detected by said plurality of receiver antennas when it is assumed that said plurality of transmitter antennas separately transmit signals.

21. (Original) A transmitter apparatus as claimed in claim 20 wherein, said physical amount corresponds to a sum of one, or a plurality of said SNRs having larger values.

22. (Original) transmitter apparatus as claimed in any one of claim 18 to claim 21 wherein, said transmission parameter is a modulation level in mapping.

23. (Currently Amended) A radio communication system comprising a transmitter apparatus (51A; 61A) for transmitting transmission signals ( $s_1, s_2$ ) by a plurality of transmitter antennas (104-1, 104-2) in a parallel manner; and a receiver apparatus (52A; 62A) for receiving said transmission signals ( $s_1, s_2$ ) by a plurality of receiver antennas (105-1 to 105-2; 105-1 to 105-4), a channel matrix ( $H$ ) for causing the signal transmitted by said transmitter apparatus to be related to said signal detected by said receiver apparatus becomes identical to a channel matrix ( $H$ ) for causing the signal transmitted by said receiver apparatus to be related to said signal detected by said transmitter apparatus; wherein,

    said transmitter apparatus comprises:  
    estimation means (106) for estimating said channel matrix;  
    calculation means (501; 601) for calculating a physical amount so as to estimate a radio line quality with respect to each of signal series based upon only said channel matrix;

determination means (111) for evaluating the radio line quality based upon the physical amount calculated by said calculation means so as to determine a transmission parameter in a next transmission operation with respect to each of signal series; and

means (201-1, 201-2) for controlling the transmission operation with respect to each of the signal series based upon the transmission parameter determined by said determination means; and wherein,

said receiver apparatus comprises:

means (107) for detecting a change in said transmission parameter from the signals received from said transmitter apparatus with respect to each of signal series.

24. (Original) A radio communication system as claimed in claim 23 wherein, said physical amount corresponds to an SNR of demodulated signals of said receiver apparatus.

25. (Original) A radio communication system as claimed in claim 23 wherein, said physical amount corresponds to a sum of SNRs of signals which are detected by said plurality of receiver antennas when it is assumed that said plurality of transmitter antennas separately transmit signals.

26. (Original) A radio communication system as claimed in claim 25 wherein, said physical amount corresponds to a sum of one, or a plurality of said SNRs having larger values.

27. (Original) A radio communication system as claimed in any one of claim 23 to claim 26 wherein, said transmission parameter is a modulation level in mapping.

28. Canceled.